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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,871	12/27/2006	Nigel Cronin	103210-0013	7093
24267 7590 06/22/2010 CESARI AND MCKENNA, LLP 88 BLACK FALCON AVENUE BOSTON, MA 02210			EXAMINER DELLA, JAYMI E	
			ART UNIT 3739	PAPER NUMBER
			MAIL DATE 06/22/2010	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/573,871	<b>Applicant(s)</b> CRONIN ET AL.	
	<b>Examiner</b> JAYMI DELLA	<b>Art Unit</b> 3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-37, 39-50, 52-70 is/are pending in the application.
- 4a) Of the above claim(s) 1-37, 42, 46, 68 and 69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39-41, 43-45, 47-50, 52-67, 70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2006 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input checked="" type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/8/2007, 12/27/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. The following is a First Action, Non-Final Office Action on the merits. Claims 39-41, 43-45, 47-50, 52-67, and 70 are addressed below.

### ***Election/Restrictions***

2. Applicant's election of Group II (claims 39-50, 52-70), Set I: Species A (claims 40-41, 49), Set II: Species B (claims 7, 45), and Set III: Species B (claims 9-11, 19-31, 32-34, 37, 52-67, and 70) in the reply filed on 5/5/2010 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

3. Claims 1-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group I, there being no allowable generic or linking claim. Claim 42 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Set I: Species C, D, or E, there being no allowable generic or linking claim. Claim 46 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Set II: Species C or D there being no allowable generic or linking claim. Claim 68 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Set III: Species E, there being no allowable generic or linking claim. Claim 69 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Set III: Species C, there being no allowable generic or linking claim.

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4. Accordingly, claims 39-41, 43-45, 47-50, 52-67, and 70 are addressed below.

### ***Drawings***

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “temperature sensor” in claims 43-44, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

6. The drawings are objected to because of shaded figures (Fig. 2C, 4c, 6b). See Draftsperson’s Notice on Form PTO-948.

7. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

8. Claim 52 is objected to because of the following informalities: change "calculating" to --calculate-- in Line 8. Appropriate correction is required.
9. Claim 52 is objected to because of the following informalities: it is suggested to reword the claim to include all structural limitations of claim 39, where "claim 39" is recited. Appropriate correction is required.
10. Claim 53 is objected to because of the following informalities: delete "determined" in Line 7. Appropriate correction is required.
11. Claim 53 is objected to because of the following informalities: replace "for calculating the speed of motion of the applicator, the control unit is configured to" to --the control unit is further configured to--. Appropriate correction is required.
12. Claims 61-67 and 70 is objected to because of the following informalities: replace "The sensor of claim XXX" with --The system of claim XXX--. Appropriate correction is required.
13. Claim 66 is objected to because of the following informalities: spell out the acronym LED and place the acronym in parenthesis after. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

14. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

15. **Claims 52-67 and 70** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 52 recites: “control the amount of radiation supplied to the applicator”. However, there is no recitation of a limitation of the system that actually supplies radiation to the applicator, and thus, the control unit can not control an amount of radiation supplied to the applicator.

16. **Claim 64-68** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 64 recites: “...at least one radiation detector adapted for receiving radiation from the cable..”. The specification states on Pg. 5, ll. 14-17 that an optical emitter emits optical radiation, and the emitted radiation is received by the radiation detector. Thus, the radiation is not received from the cable, but from an optical emitter.

17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. **Claims 39, 43-44, 52-53, 56, 60, 64, and 70** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

19. Regarding claim 39, the phrase "for example" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

20. Claim 39 recites the limitation "the tissue" in Line 12. There is insufficient antecedent basis for this limitation in the claim.

21. Claim 43 recites: "...said temperature sensor preferably comprising a thermocouple or a fibre optic sensor". As written, the claim does not positively recite either a thermocouple or a fibre optic sensor with the use of the word "preferably". It is thus unclear as to whether Applicant is using another kind of temperature sensor or one of these two.

22. Claim 44 recites the limitation "the temperature sensor" in Line 5. There is insufficient antecedent basis for this limitation in the claim.

23. Claim 44 recites: "...the elongate member is coupled to the source of radiation via a coaxial cable, and a portion of said cable in abutment with the radiation emitting portion is surrounded by, and attached thereto, by a conductive ferrule...". It is unclear whether the cable is attached to the conductive ferrule or the radiation emitting portion. For purposes of examination, the claim will be examined as the cable being attached to the conductive ferrule.

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24. Claim 52 recites the limitation "the motion rate signals" in Line 6, "the speed of motion" in Line 8, "the amount of radiation" in Line 9, and "the rate of motion" in Line 9.

There is insufficient antecedent basis for these limitations in the claim.

25. Claim 52 recites the limitation of "and/or" in Line 9, which is indefinite. For purposes of examination, the claim will be interpreted as being "or".

26. Claim 53 recites the limitation "the polling interval" in Line 3 and "counts" in Line 4. There is insufficient antecedent basis for this limitation in the claim.

27. Claim 53 recites the limitation "R" in Line 3. There is insufficient antecedent basis for this limitation in the claim.

28. Claim 56 recites the limitation "the polling interval" in Line 1 and "the conversion factor" in Line 2. There is insufficient antecedent basis for this limitation in the claim.

29. Claim 60 recites the limitation "the cable" in Line 3 and "the article" in Line 5. There is insufficient antecedent basis for this limitation in the claim.

30. Claim 64 recites: "...at least one radiation detector adapted for receiving radiation from the cable..". It is unclear how the cable is emitting radiation since the cable is not given as a source of radiation, but rather an optical emitter is (Specification Pg. 5, ll. 14-17). For purposes of examination, the claim will be interpreted as receiving radiation from an optical emitter.

31. Claim 70 recites the limitation "the polling interval" in Line 1 and "the rate of rotation" in Line 5. There is insufficient antecedent basis for this limitation in the claim.



***Claim Rejections - 35 USC § 101***

32. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

33. **Claims 52-70** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 52 positively recites a limitation ("calculating") that overlaps statutory classes. In this case, the applicant has positively recited a method and an apparatus in the same claim. See MPEP 2173.05(p) II.

***Claim Rejections - 35 USC § 102***

34. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

35. **Claims 39-40 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Cronin (WO 00/49957).**

36. Concerning **claim 39**, as illustrated in Fig. 1-3, Cronin discloses **an applicator for applying radiation to hollow anatomical structures** (tip region 200 of microwave applicator; Fig. 1), **for example varicose veins, comprising:**

**an elongate member** (distal tip region 200), **the elongate member including an emitter** (antenna 240), **the emitter being coupled to a source of microwave radiation and being adapted to emit said radiation** (cylindrical and hemispherical

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sections 260 and 270 are taken to be the emitter, which include antenna 240 that is coupled to microwave radiation generator 110 and is adapted to emit microwave radiation; Pg. 4, ll. 9-12);

**wherein the emitter includes**

**a radiation emitting portion made of dielectric material and having an axis of elongation** (dielectric body 250 forms the emitter 260, 270 and has an axis of elongation), **and**

**an elongate conductor within and extending at least partially along the radiation emitting portion** (antenna 240),

**the radiation emitting portion being shaped and dimensioned so as to emit said radiation at a predetermined intensity in a field of limited dimensions adjacent thereto, whereby occlusion of the tissue of a hollow anatomical structure within said field is effectively accomplished** (hemispherical section 270, which is formed by dielectric body 250, is dimensioned to have a radius that encourages forward propagation of the radiation by means of internal reflection and/or resonance. Further, when used at a certain frequency and wavelength, examples given on Pg. 5, ll. 16-20 and Pg. 6, ll. 13-20, the radiation emitting portion 250 is shaped and dimensioned to emit radiation at a predetermined intensity in a field of limited dimensions and is thus capable of effectively accomplishing occlusion of hollow anatomical tissue structure; Pg. 5, ll. 7-14).

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37. Concerning **claim 40**, Cronin discloses the radiation emitting portion (260, 270) to include a generally conical tapering portion (270) that forms a tip for insertion into a hollow anatomical structure (Fig. 2-3).

38. Concerning **claim 49**, Cronin discloses the radiation emitting portion (260, 270) to include a substantially cylindrical portion (260) integral with the tapering portion (270).

### ***Claim Rejections - 35 USC § 103***

39. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

40. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

41. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**42. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957), as applied to claims 39-40, in view of Taylor (4,534,347).**

43. Concerning **claim 41**, Cronin discloses the field being disposed substantially around said tip (Fig. 2). Cronin fails to disclose the elongate conductor extending along the entire length of the radiation emitting portion. However, Taylor discloses a microwave radiating applicator that has a conductor (51a) that extends along the entire length of a radiation emitting portion into (entire tip within coaxial shield 54a) (Fig. 6). At the time of the invention, it would have been obvious to one of ordinary skill in the art to extend the conductor all the way to the tip, along the length of the entire radiation emitting portion, in order to provide the benefit of creating a desired radiation field, and since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

**44. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957), as applied to claim 39, in view of Warner et al. (5,693,082).**

45. Concerning **claim 43**, Cronin fails to disclose a temperature sensor on the elongate member that is preferably comprised of a thermocouple or fibre optic sensor.

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However, Warner et al. disclose a microwave ablation catheter (50) that has an elongate member (51), and a radiation emitting portion (80) that includes an dielectric emitter and conductor (56, 75) and a temperature sensor (65) on the elongate member (51), where the temperature sensors are comprised of thermocouples or fiber optical sensors (Col. 5, ll. 61, Col. 8, ll. 22-23; Fig. 6). At the time of the invention, it would have been obvious to one of ordinary skill in the art to include a temperature sensor on the elongate member in order to provide the benefit of being able to detect overheating of tissue or catheter elements and damage to the catheter, thermometry element conditions in the event of catastrophic damage as taught by Warner et al. (Col. 6, ll. 24-31).

**46. Claims 44 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957), as applied to claim 39, in view of Moorman et al. (2002/0058932) and Warner et al. (5,693,082).**

**47.** Concerning **claim 44**, Cronin discloses the elongate member (200) to be coupled to the source of radiation (110) via a coaxial cable (120) (Fig. 1). Cronin fails to disclose the portion of the cable in abutment with the radiation emitting portion to be surrounded by and attached thereto, by a conductive ferrule. However, Moorman et al. disclose a coaxial cable (100) attached to a radiation emitting portion (40) via a conductive ferrule (75) that is attached to and surrounds the coaxial cable (100) ([0053], [0068]; Fig. 10). At the time of the invention, it would have been obvious to one of ordinary skill in the art to connect the radiation emitting portion to a coaxial cable with a conductive ferrule in

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order to provide the benefit of electrically coupling conducting current from the source of radiation to the radiation emitter as taught by Moorman et al. ([0053]).

Cronin as modified by Moorman et al. fail to disclose a temperature sensor disposed on the ferrule. However, Warner et al. disclose a microwave ablation catheter (50) that has an elongate member (51), and a radiation emitting portion (80) that includes an dielectric emitter and conductor (56, 75) and a temperature sensor (65) on the elongate member (51), and specifically on ferrule (78), where a coaxial cable (53) is connected to radiation emitting portion (56, 75). (Col. 5, ll. 61, Col. 8, ll. 22-23 and 49-51; Fig. 6-7). At the time of the invention, it would have been obvious to one of ordinary skill in the art to put the temperature sensor on the ferrule in order to provide the benefit of providing distance for the protection of the electronic circuitry of the thermometry sensors and to prevent their interference with the electromagnetic field and to prevent interference of the electromagnetic field with their measurements as taught by Warner et al. (Col. 8, ll. 37-48).

48. Concerning **claim 50**, Cronin discloses the elongate conductor (200) to be comprised of a portion of the inner conductor (220) of the coaxial cable (120) that protrudes axially beyond the outer casing (210) of the cable (Pg. 4, ll. 19-25; Fig. 2).

**49. Claims 45 and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957), Moorman et al. (2002/0058932), Warner et al. (5,693,082), as applied to claims 40 and 44, and in further view of Takehana et al. (4,930,494).**

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50. Concerning **claims 45 and 47-48**, Cronin as modified by Moorman et al. and Warner et al. fail to disclose a series of regularly spaced alternating light and dark colored markings that are about 1 cm long provided on the exterior surface of the coaxial cable along its length. However, Takehana et al. disclose an endoscope system with a cable (catheter shaft) that has alternating, regularly spaced, predetermined width ( $\Delta l$ ), light and dark markings along its length. At the time of the invention, it would have been obvious to have regularly spaced alternating light and dark colored sections along the exterior of the cable's length in order to provide the benefit of detecting the distance of insertion of the cable as taught by Takehana et al. (Col. 7, ll. 44-54, Col. 18, ll. 10-15; Fig. 1, 8, 35) Further, it would have been an obvious matter of design choice to one having ordinary skill in the art at the time the invention was made to space the sections at 1 cm, since applicant has not disclosed that 1cm sections solves any stated problem or is for any particular purpose and it appears that the invention would perform equally as well with any width or length depending on the procedure being performed (i.e., with a pediatric patient or an adult).

51. **Claims 52-64 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957), as applied to claim 39, in further view of Junior (6,520,928).**

52. Concerning **claims 52 and 55**, Cronin discloses the applicator as discussed in the rejection of claim 39 above, but fails to disclose a motion rate sensor arranged, in use, for detecting the rate of movement of the applicator; a control unit coupled to the

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sensor for receiving the motion rate signals output thereby; wherein the control unit is configured to calculating the speed of motion of the applicator using said motion rate signals, and control the amount of radiation supplied to the applicator and/or the rate of motion of the applicator in dependence upon said calculated speed of motion.

However, Junior discloses a medical injection system (10) where a motion rate sensor (25), comprised of ring (156) that has a plurality of uniformly spaced holes (158) and optical reader (160), which generates a pulse upon the passage of one of the holes (158), detects the rate of forward or backward movement of an applicator (128) which functions to eject or aspirate fluids from needle (18) and is mounted on the end of an elongate threaded shaft (23), or cable, and thus detects the rate of movement of the applicator (128); a control unit (16) that is coupled to the sensor and receives the motion rate signals that is configured to calculate the speed of motion of the applicator using the motion rate signals and control the rate of motion to adjust the flow rate and volume of liquid expelled from the needle (18). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a motion rate sensor which sends rate signals to a control unit to calculate the speed of an applicator and then control the motion rate of the applicator depending on its speed in order to provide the benefit of precisely monitoring and adjusting the flow rate and volume of liquid expelled as taught by Junior. (Col. 2, ll. 31-45, Col. 6, ll. 22-28; Fig. 2 and 9)

53. Concerning **claims 53-54 and 56**, Junior further discloses that the control unit (16) polls the optical reader (160) when the optical reader (160) generates pulses upon passage of a hole (158) in ring (156) that are transmitted to control unit (16) to adjust



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the speed and duration of operation of the motor (20), and then calculates the rotational speed of ring (156) using the counts from the pulses generated by the optical reader (160) (Col. 8, ll. 30-34). It is inherent that in order to calculate the linear speed/rate of motion of the applicator, the rotational speed is calculated using the known constants of the radius of the wheel and the total number of uniformly spaced holes (158) to determine an arc length. Then, knowing that rotational speed is equal to an angle  $\theta$  generated by the arc length between two holes divided by the time between the pulsed signals of the two holes, the linear speed is calculated. Thus, at the time of invention it would have been obvious to one of ordinary skill in the art to determine the speed of the cable by using a determined difference value and conversion factor R since there are a limited number of ways of determining a rate of linear motion, and thus, it would have been obvious to one of ordinary skill in the art to try all of the methods.

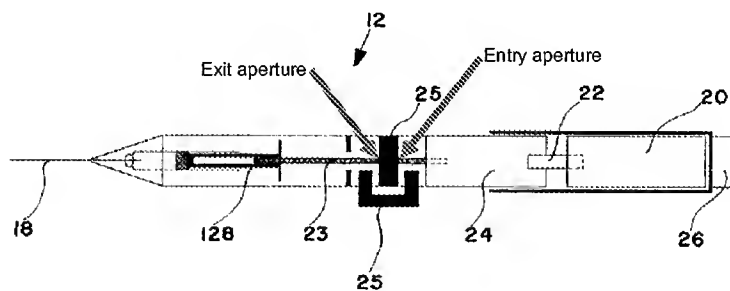
54. Concerning **claims 57-59**, Cronin discloses a display device (19) under the control of control unit (16) that is capable of displaying the calculated speed of motion applicator and a graphical representation in the form of a speedometer of that speed of motion (Col. 2, ll. 61-62).

55. Concerning **claim 60**, Junior further discloses the motion rate sensor comprising a housing (25), to which, in use, the cable (23) moves, a detection unit (156, 160) disposed within the housing (25). The detection unit (156, 160) includes an optical reader (160) which inherently includes a conversion device adapted for generating detector signals caused by motion of the cable and processing circuitry that is adapted for receiving detector signals and outputting motion signals indicative of the rate of

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movement of the article, since the optical reader is capable of knowing when a hole passes by, generating a pulse upon passage of the hole, and sending this signal to the control unit (16) (Fig. 2).

56. Concerning **claims 61-63**, Junior further discloses that the housing (25) includes at least one aperture that includes an entry aperture, through which the cable enters the housing and an exit aperture, through which the cable exits the housing, that permits **substantially** linear motion of the cable relative to the housing as illustrated in annotated Fig. 2 below.



57. Concerning **claim 64**, Junior further discloses the conversion device (156, 160) to include a radiation detector in the form of an optical reader that is capable of receiving radiation from an optical emitter (i.e., the sun) and generating detector signals in dependence on said received radiation (Col. 8, ll. 30-34).

58. Concerning **claim 70**, Junior further discloses the conversion device (156, 160) to include a rotatable member (156) that contacts the cable (23) and is rotated when the conversion unit is in use; Junior also further discloses an electromechanical device (160) that is adapted to generate detector signals in dependence upon the rate of rotation of the rotatable member (156). (Col. 6, ll. 23-38, Col. 8, ll. 26-34; Fig. 8)

59. **Claims 65 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957) in view of Junior (6,520,928), as applied to claims 52-64, in further view of Takehana et al (4,930,494).**

60. Concerning **claim 65**, Junior further discloses the radiation to be optical radiation since the detection device is an optical reader (160). Cronin as modified by Junior fail to disclose the detection unit further including an optical emitter for emitting the optical radiation, and the radiation detector being disposed so as to receive optical radiation after reflection from a cable. However, Takehana et al. disclose a cable with striped markings of uniformly distributed light and dark sections and a sensor portion (5) for detecting the striped patterns of marking portion (4) on the cable. Sensor portion (5) includes three photosensors (5a,b,c) that are composed of a light emitting element, or optical emitter, and light receiving element, or radiation detector that receives reflections of the optical emitter from the cable (Col. 7-8, ll. 44-23, Col. 18, ll. 10-26; Fig. 1-2 and 35). At the time of the invention, it would have been obvious to one of ordinary skill in the art to have an optical emitter emit a source of radiation that reflects off of light and dark markings of uniform distance and width to be received by a radiation detector in order to provide the benefit of allowing the device to operate where no natural optical emitter (i.e., the sun) is present.

61. Concerning **claim 67**, Cronin as modified by Junior fail to disclose the cable having a plurality of markings or reflective elements disposed on its surface in a repetitive pattern along its length. However, Takehana et al. disclose an endoscope system with a cable (catheter shaft) that has alternating, regularly spaced,

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predetermined width ( $\Delta l$ ), light and dark markings along its length. At the time of the invention, it would have been obvious to have regularly spaced alternating light and dark colored sections along the exterior of the cable's length instead of on a rotating wheel with holes in order to provide an alternative method of detecting the distance of insertion of the cable as taught by Takehana et al. (Col. 7, ll. 44-54, Col. 18, ll. 10-15; Fig. 1, 8, 35), and in order to provide the benefit of having on less degree of error on the speed of the motion when having to convert the rotational speed of a ring to linear speed of an attached cable. Further, it would have been an obvious matter of design choice to one having ordinary skill in the art at the time the invention was made to space the sections at 1 cm, since applicant has not disclosed that 1cm sections solves any stated problem or is for any particular purpose and it appears that the invention would perform equally as well with any width or length depending on the procedure being performed (i.e., with a pediatric patient or an adult).

**62. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin (WO 00/49957) in view of Junior (6,520,928) and Takehana et al.**

**(4,930,494), as applied to claim 65, in further view of Benaron et al. (5,762,609).**

**63.** Concerning **claim 66**, as discussed in the rejection of claim 65 above, Takehana et al. disclose the optical emitter and radiation detector to comprise an integral device in sensor portion (5) (Col. 7, ll. 55-57; Fig. 1-2). Cronin as modified by Junior and Takehana et al. fail to disclose a specific type of optical emitter, particularly an LED. However, Benaron et al. disclose a surgical tool that includes a radiation detector and

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LED optical emitter (Col. 4-5, ll. 57-19). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use an LED as the optical emitter in order to provide the benefit lower power consumption and increased luminance.

### ***Conclusion***

64. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: **van der Welde (2005/0245919)** discloses a microwave radiation applicator; **Van Egmond et al. (5,709,661)** discloses an electronic catheter displacement sensor system; **Lewis et al. (2003/0187369)** discloses an optical sensor catheter displacement system; **Yamaguchi (JP 3-286780)** discloses a microwave radiation system with a control for adjusting the driving amount of a motor driving circuit and adjusting the taking-in-and-out amount of radiation receiving antennas; **Cronin (GB 2387544)** discloses a microwave applicator; **Dickinson et al. (6,275,724)** discloses a motion rate sensor for a catheter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYMI DELLA whose telephone number is (571)270-1429. The examiner can normally be reached on M-Th 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571)272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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